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**Transdisciplinary Archaeology and the Future of Archaeological Practice: Citizen  
Science, Portable Science, Ethical Science**

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## **Abstract**

This paper presents a vision and a pathway for the future of archaeological practice, in which several fields of that are currently considered distinct, including community-based collaborative archaeology, indigenous archaeology, and applied archaeology, could become the norm. Inspired by personal encounters with some exceptionally open and collaborative archaeology projects, as well as by recent advances in archaeological science, which are starting to make it more portable, this paper sets out an agenda for a more open approach to archaeological practice. It advocates a method of producing knowledge about the past that does not privilege one investigator over another, but gives everyone who is interested and wants to participate an opportunity to do. Specific methodological challenges that are discussed include the need to ‘flip’ the public outreach element of research designs, to embed open participation from the outset by nurturing relationships of mutual respect and trust, and to take advantage of, and improve, the portability of archaeological science, so that it can be done in and by local communities. It is argued here that the opening of archaeological research, including the archaeological sciences, to a wider range of participants, is the most ethical approach to archaeological practice in a pan-disciplinary research environment.

## **Key words**

Community-based archaeology, collaborative archaeology, indigenous archaeology, applied archaeology, archaeological ethics

Alfredo González-Ruibal and Ewa Domanska have offered thought-provoking papers that reaffirmed my view that archaeology will have many roles in the future – one could say ‘many futures’. They also highlight that what archaeology *is* – what constitutes archaeological knowledge and practice – is changing for many archaeologists, and will continue to do so. I dare not make this claim for all archaeologists, because we are all different, and come to our study of the past with different interests, aims, and ambitions. Not all archaeologists investigate topics that lend themselves to political activism, for example, and if they did so, a large proportion of human history would remain unstudied. Even historical archaeologists, whose material arguably lends itself best to ‘activist’ or ‘action archaeology’ (as defined by Sabloff 2008, p. 17), do not universally wish to devote their research and writing time to criticising the political and economic structures that caused the world’s current environmental problems, conflicts, and asymmetrical social relations (as suggested by Alfredo González-Ruibal in this volume; also see González-Ruibal *et al.* 2018). That is understandable. We should not expect or even want all archaeology to be political or activist. However, we *should* expect all archaeology to be ethical.

In my view, what we might anticipate in the future – and might even come to accept as the norm – is a particular way of doing archaeology in which a transdisciplinary study of the past is embedded ethically in contemporary societies, and is done with and by a variety of participants. It is an approach to knowledge production already embraced by many archaeologists – in some cases for decades (e.g. Barnes 2018 and numerous examples in Marshall 2002). It is what Ewa Domanska (this volume) called the ‘participatory approach to knowledge building’ – an all-encompassing description that includes ‘citizen science’ and ‘collaborative’, ‘community-based’, ‘indigenous’, ‘participatory’, and ‘public’ archaeologies. I think of it simply as ‘Open Archaeology’, a way of producing new knowledge about the

past that does not privilege one investigator over another, but gives everyone who is interested and wants to participate an opportunity to do so. This concept of an open, collaborative approach to generating archaeological knowledge should not be dismissed as mere ‘flattery’ of the wider public (as suggested by González-Ruibal *et al.* 2018). Nor does it rob professional archaeologists of the authority they have earned through years of focused learning, research, and practical experience; on the contrary, most volunteers participate in archaeological research in order to have an opportunity to work side-by-side with, and to learn, from professional archaeologists. However, an open, collaborative approach to archaeology, in which each individual or social group contributes their own knowledge, skills, experiences, resources, and in some cases even finances, towards a shared goal, does rely on a willingness to listen to and to learn from one another, and sometimes to negotiate research agendas and interpretations (Zimmerman 1997, p. 55, Blakey 2001, p. 415, Colwell-Chanthaphonh and Ferguson 2004, p. 21, McGuire 2008, pp. xii, 232-233). Incidentally, it is this broader concept of communities of archaeological practice that very often results in successful political activism (e.g. numerous examples in Atalay *et al.* 2014 and McGuire 2008).

There is no naïve assumption inherently embedded in the participatory approach to archaeological research that everyone is interested in the past, has a notion of their personal or regional heritage, or has unselfish motives to investigate or preserve heritage sites. But there are many people who make their living outside of the heritage sector who are as fascinated by the past as archaeologists are, and it is only fair that those who are in the privileged position of doing archaeology for a living are open, enabling, and collaborative with others who are also interested in the pursuit of new knowledge. The past belongs to everyone, and professional archaeologists do not hold the monopoly on its study. It is

especially important to be open to those whose heritage we are investigating (e.g. La Roche and Blakey 1997, Moser *et al.* 2002), but openness should not be restricted to people who live in the locale of the study site or landscape, or their dispersed descendants (Marshall 2002, Tully 2007), because today participation takes many forms. Volunteers not only travel tens, hundreds, or even thousands of miles to participate in archaeological surveys and excavations in person; there are also ‘online communities’ of volunteers who do archival research (Danish National Archives 2018), search for archaeological sites using satellite imagery (GlobalXplorer<sup>o</sup> 2018), and crowdfund archaeological projects so that they can follow the progress of the research online (e.g. DigVentures 2018).

Like Ewa Domanska and others (e.g. Atalay 2012, p. 23, McAnany and Rowe 2015), I see this type of Open Archaeology as fundamental to the future role of archaeology in a transdisciplinary research environment. As Ewa Domanska points out in her paper, this approach has inherent challenges that require us to re-think how we conduct our scientific investigation of the past, who we do it with, who we do it for, and what we accept as new scientific knowledge. An additional point that I would like to make is that Open Archaeology also requires us to develop new scientific approaches that can be more easily brought out of the laboratory and used in the field, and, importantly, can be taught to and used by participants from a wide range of backgrounds.

My vision for archaeology’s future in a transdisciplinary research environment is highly personal, because it is inspired by my encounters with some exceptionally open and collaborative archaeology projects, as well as by recent advances in archaeological science, which are starting to make it more portable. Since the projects I have encountered and taken

part in have framed my perception of what is needed, methodologically, for open archaeology to reach its full potential, I will summarise one of them briefly here.

### **Citizen Science: The Nunalleq Project, Alaska**

In 2006, a group of young Yup'ik men from the village of Quinhagak, southwest Alaska, were walking on the shore when they noticed a well-preserved wooden mask on the beach (Knecht 2014). The following summer, after finding wooden dolls and toy kayaks, Warren Jones, the manager of the village corporation, sent some photos to Dr. Rick Knecht. Rick had been working on Alaskan archaeology since the 1980s, had founded museums in Kodiak and the Aleutians, and was then working at the Department of Alaska Native and Rural Development, at University of Alaska Fairbanks. Importantly, they trusted him. He came to have a look and together they followed a trail of objects on the beach to their source: an abandoned prehistoric village already known to elders as Nunalleq: 'old village'. Concerned that 1-2 m were being lost to the sea every year, the village corporation applied for funds and invited Rick to lead a rescue excavation. What they found was a village of sod houses, containing tens of thousands of well-preserved organic and inorganic artefacts, traces of a fire that had been used to smoke out the 50 or so residents, and the skeletal remains of men, women and children who had died in a violent attack in around 1660 AD. The conflict is preserved in Yup'ik oral history as the Bow and Arrow Wars (Funk 2010, Knecht 2014, Fienup-Riordan *et al.* 2015).

Moving to the University of Aberdeen, Rick teamed up with bioarchaeologist Kate Britton and Charlotta Hillerdal, a specialist in indigenous archaeology. In 2013, on the back of the Yup'ik-funded excavation results, they received £1.1 million from the UK's Arts and

Humanities Research Council to continue the excavations together with the villagers of Quinhagak. Yup'ik people participated in the excavation alongside archaeology students from the UK, the US, and elsewhere, and contributed to the interpretations of the artefacts found. Scientists who normally conduct their research in laboratories, including an archaeoentomologist, an archaeobotanist, and a zooarchaeologist, came on site to excavate, demonstrate, teach, and learn. Yup'ik craftspeople began to reincorporate designs they saw in the archaeological finds into their carvings and weavings (Cotsirilos 2017). Conversations over artefacts engaged young and old, and were an important medium for trans-generational learning about traditional life-ways and knowledge (*Children of the Dig* 2018). In 2014, the first dance held in Quinhagak in more than a century took place during an artefact 'show and tell' organised by the excavation team (Fienup-Riordan *et al.* 2015, p. 41). The song, sung in Yup'ik, was about the storms that had exposed the site, followed by a message of welcome to the artefacts themselves – as if the pieces were community members (Weiss 2015). In 2018, children who had grown up with project, and had formed a large dance group on their own, wrote a song about the dig, and performed it at the site itself. They danced it with a walrus-man mask based on one found on the excavation in 2015 – the first masked dance since the practice was banned by Moravian missionaries in the 19<sup>th</sup> century (Richard Knecht, pers. comm.). When embedded in communities, especially descendent communities, archaeology can be genuinely empowering.

It can also be a motivator for change. Lacking adequate conservation and research facilities in the field, over 60,000 objects and hundreds of samples were shipped all the way to Scotland for conservation, recording, and analysis. In the summer of 2018 the artefacts were shipped back to Quinhagak for permanent storage and exhibition (Nunalleq 2018). The village corporation of Quinhagak, Qanirtuugq Inc., had provided funds to establish the *Nunalleq*



*Culture and Archaeology Center* in a former school building donated by the school district – a local archaeological repository, museum, and conservation centre, which was officially opened on August 11, 2018 (Figure 1). Excavation, and artefact cleaning, conservation, and material culture research continues – but now all in one place, managed locally by Quinhagak Heritage, Inc., a non-profit organisation. Speaking to hundreds in a packed room at the centre’s opening, elder Grace Hill talked about how important it was that the corporation had acted quickly to save the artefacts, and had kept them under local control. She encouraged other tribal communities to do the same, noting how crucial it is for artefacts to stay within tribal communities, in the Yup’ik cultural context (Trudeau 2018). Village corporation president Warren Jones also described the importance of the excavation for present and future generations. He said that “the dig was started for their children so that they will never forget where they came from, and that they are not only excavating, they are finding out about everything. He hopes that youth will continue to engage and learn from their work there, with some going on to pursue higher education and coming back as archaeologists to run the project” (Trudeau 2018).

The Nunalleq case study serves to illustrate the key points that I would like to make. Most importantly: Archaeology Genuinely Matters. It matters to many people, not just to those of us privileged enough to work daily – in a professional capacity – on sites, monuments, landscapes, texts and objects of the past (see also Sabloff 2008, Atalay 2012, p. 5). The Nunalleq story also vividly illustrates that archaeology does not need to try to be something it cannot be in order to be socially relevant. Here I am thinking of attempts to use the long-term perspective – the *longue durée* – as a source of predictive data of relevance to modern policy makers trying to manage contemporary political and economic problems, such as environmental change, food security, and sustainable resource exploitation (e.g. see

numerous examples in Cooper and Sheets 2012 and Costanza *et al.* 2007). The simple fact is that our current problems are unique: culturally, geographically, and temporally contingent. It is laudable to try to learn ‘lessons’ from the distant past, but the past will never actually repeat itself – recent rapid geopolitical, technological, and environmental changes have seen to that. But the past is important in and of itself because most people yearn to know more about who they are, how they got to where they are, and why they think and feel the way they do. An improved understanding of the past, especially a past that has involved suffering, can have healing power (Riede *et al.* 2016; e.g. Cox 2018 and Anna-Lisa Cox pers. comm.). These impacts are real, not just a box-ticking exercise for our applications to funding bodies.

I would contend that these important social impacts increase exponentially when the generation of new knowledge about the past is embedded in and done collaboratively with contemporary societies – descendent, local, or dispersed – especially when they are given an opportunity to help shape a research design that is relevant to them, and an opportunity to actively participate in the research. An archaeology of the future needs to be *for* everyone, and *with* anyone who wants to take part. We can all take inspiration from Scotland’s Archaeology Strategy for 2015-2025, developed with input from across the sector and the wider public, which opens: “*We want to live in a Scotland where archaeology is for everyone! A place where the study of the past offers opportunities for us now and in the future to discover, care for, promote and enjoy our rich and diverse heritage, contributing to our wellbeing and knowledge and helping to tell Scotland’s stories in their global context*” (Scottish Strategic Archaeology Committee 2015). This vision for the future of archaeology has two important implications for archaeological method. It requires professional archaeologists to ‘flip’ the public outreach element of their research designs, and to turn their science laboratories inside out. I will briefly explain what I mean by these.

## **Implications of the Open Archaeology Approach for the Future Practice of Archaeology**

### ***The Flipped Research Design***

For archaeological research to be firmly and ethically embedded in contemporary society, archaeologists need to ‘flip’ the public outreach elements of their research designs, so that open participation is fundamental from the start, not an addendum relegated to ‘impact statements’, ‘open days’, or ‘public engagement events’. Like the Yup’ik community in Alaska, the diverse communities who may be interested in a particular project, the people ‘allied’ around a shared issue, should be befriended and engaged in open and respectful conversation (Tillmann-Healy 2006, Mizoguchi 2015). Rick Knecht put it this way: “People [normally] share their results, but it’s not the same as real power sharing, and making joint decisions on how to approach an archaeological site, and dealing with the artifacts and interpretation....What we’re trying to do is [work] as equal partners to make sure that native voices are fully included... It starts with planning a project that meets local needs and not just scientific needs” (Trudeau 2018). This type of citizen science is my hope for the future of archaeology. Citizen science is knowledge sought and created by a potentially vast and diverse community of archaeological participants, not just those who earn their living doing it. If this trajectory – this aspiration – comes to fruition, the result will be the eradication of several fields of archaeology that are currently considered distinct, including community-based collaborative archaeology, indigenous archaeology, and applied archaeology. In this future, the research approach that currently make these archaeologies distinct would become the norm.

I am not claiming here that this is an easy path to take. As noted by several practitioners, one of the issues that can make community-based participatory research challenging is that the broadened base of participants brings with it the potential for competing interests, agendas, ways of knowing, and world-views, which then have to be negotiated (e.g. Anyon *et al.* 1997, Atalay 2012, p. 257). In Quinhagak, for example, a number of village elders were initially reluctant for the excavation of Nunalleq to proceed, because they felt that ancestors should not be disturbed. After his meeting with Rick Knecht, it took Warren Jones, the head of the village corporation, two years of meeting individually with village elders to get approval for the excavation project. It took time, but some of the elders who were most hesitant at the beginning are now among the project's strongest supporters (Rick Knecht, pers. comm.).

A key challenge is that participatory archaeology cannot even be initiated without a relationship of trust between the archaeologist, the local community, and sometimes more dispersed groups of potential participants, and this can take a long time to develop (Colwell-Chanthaphonh and Ferguson 2004, 2006). As Colwell-Chanthaphonh and Ferguson (2004, p. 23) point out, "An ethic of collaboration involves no simple rule or moral equation; it entails the cultivation of sincere relationships guided by virtuous ideals – civility, cooperativeness, tactfulness, patience, trust, honesty, thoughtfulness, tolerance and respect." This takes time, open-mindedness, a common language, and in some cases finances (e.g. to travel to the study area regularly) that might be out of reach of some archaeologists. For commercial archaeology companies running projects at long distances from their home base, often for short periods of time, under heavy time constraints, and on construction sites where heavy machinery makes it unsafe for the public, the logistical challenges of actively involving the local community may sometimes be insurmountable. Yet, even in the commercial archaeology environment, where research questions are developed on the basis of the

archaeological remains that happen to be threatened, and that are scheduled for recording and sampling, it is not uncommon in the UK for local volunteers to be invited to participate in excavations when it is safe for them to do so. It is, in fact, in the best interests of the clients of commercial archaeology to nurture a relationship of trust with local communities by making time and funds available for community-based activities, and by making commercial excavations as consultative and open as possible.

It is important to note other logistical challenges that may have to be overcome in order for an Open Archaeology approach to work. Some of these were encountered by myself, other university-based colleagues, and individuals among our community partners, the Bailies of Bennachie, during a collaborative project on the Bennachie Colony, in Aberdeenshire, Scotland (Oliver *et al.* 2013, Oliver 2015, Oliver *et al.* 2016, Armstrong *et al.* 2017). For example, research- and activity-planning meetings, training sessions, archival research and archaeological fieldwork, post-excavation work, and dissemination activities, including co-publication, all had to be scheduled to enable maximum community participation (Figure 2; see also Atalay 2012, p. 258). This usually required the scheduling of evening meetings and weekend fieldwork, which was only possible for those who lived close to the study site, and coordinated ‘time off’ from their normal day jobs for the community participants of our summer excavations. The need to time research activities around the schedules of all participants can also have a detrimental effect on the pace of research projects (Atalay 2012, pp. 259-260, 265), something that might be a source of frustration for archaeologists (and their funders) who are accustomed to a faster pace. Another logistical and methodological challenge, which I will now discuss in more detail, is the need to bring conservation science and analytical techniques out of the closed university laboratory and into the field, even to the

most remote regions, where they can be taught to, done by, and discussed with other interested participants.

### ***Portable Science***

The production of scientific knowledge is usually restricted to laboratories – spaces that are inaccessible and invisible to most people. However, as Moshenska (2013, p. 212) has pointed out, the “production of knowledge behind closed doors raises questions of identity, authority, trust and consent that lie at the heart of the democratic project.” I would contend that archaeological scientists have an ethical obligation to improve the accessibility and portability of archaeological science in order to enable citizen science.

There are various ways forward. Some archaeologists have been making science more accessible by putting it online. Sarah Parcak and her team at GlobalXplorer<sup>o</sup> (2018), for example, have made satellite imagery freely available, and provided online training and tools to analyse it. DigVentures (2018) has developed an innovative online site archive, where all site data, from excavation records through to the laboratory analyses of artefacts and environmental samples, are uploaded and immediately available to the wider public. Post-excavation procedures that do not require equipment more complicated than microscopes, such as the processing of environmental samples and conducting archaeobotanical and zooarchaeological analyses, are already done in the field by many projects in regions where it is not possible (legally or logistically) to remove soil samples or ecofacts. But portable science can and should go further than this to include analytical procedures that are normally conducted in laboratories with restricted access. What I envision for the future of a pan-disciplinary, open archaeology is the development and use of a wide range of portable

scientific equipment that can be packed into backpacks, duffle-bags, or boxes, and taken to the field – what can be conceived of as ‘inside out laboratories’.

Progress in this direction has already been made in recent years, and techniques long considered bound to formal laboratories are starting to be turned ‘inside out’. For example, Yuval Goren has been developing novel and inexpensive procedures for making rock and soil thin sections and analysing them in the field – methods that normally require a well-equipped laboratory with heavy and immovable equipment (Goren 2014, 2016). Soil micromorphology now joins the ranks of a growing suite of portable geoarchaeological and material analyses, which also include portable magnetic susceptibility, pH, portable phosphate analysis, and multi-element analysis by portable x-ray fluorescence (e.g. Anderson *et al.* 2016, Schneider *et al.* 2016, Duffy *et al.* 2017, Tang *et al.* 2018). As Goren (2014) rightly points out, this innovation means that investigations normally relegated to the post-excavation stage, away from the field site, can now be done concurrently with fieldwork. Information that he refers to as ‘post-mortem’, because it cannot be used to steer the direction of field investigation, or to re-target sampling, can now become available during the excavation season. For example, geoarchaeological field labs were crucial for the research conducted by myself and other colleagues on the JPI Climate: HUMANOR Project, which involved the investigation of human-animal relations at remote early medieval sites in northwest Siberia and northern Sweden (Figure 3). Being able to analyse soil phosphate, electrical conductivity, and magnetic susceptibility values in the field made it possible for us to reduce the size and number of the soil samples that we had to transport out of the field by helicopter, on which there were strict weight limits. However, the effects of portability can go much further than this. By taking science into the field, archaeological scientists have the potential to mobilise wider participation in the generation of new knowledge.

My prediction – my hope – for the future of archaeology is that this trend continues and the inside out archaeological lab becomes the norm. To embed archaeological science in communities requires more than portability of equipment, however. It also requires that archaeological specialists take the time to teach other participants the principles of the methods, to demonstrate how the methods are conducted, to train non-specialists to enable them to participate in data collection, and to openly discuss how the data can be interpreted with any participants who are interested in learning. They need to communicate all of this in language that is comprehensible to the non-specialist. Taking post-excavation sciences into the field will open the whole of archaeological practice to a wider range of participants, but it will also transform fieldwork in a number of ways. First, it will improve the quality of excavations, because more scientific information will be available to help steer excavation and sampling strategies, and interpretations ‘at the trowel’s edge’ (Hodder 1999, p. 83). But excavations will also be improved because people who engage in post-excavation data collection and analysis become better field archaeologists, with a deeper understanding of the materials they are excavating, the artefacts and ecofacts they are recovering, and the samples they are taking. Finally, portable science embedded in Open Archaeology projects will enhance the ethics, accountability and reliability of archaeology as a whole, because “openness, visibility and comprehensibility are valid standards against which to judge the forms of knowledge production in a democratic society” (Moshenska 2013, p. 212)

### ***Ethical Science***

Eighteen years ago, writing at the turn of the 21<sup>st</sup> century a reflection on the impact of the Working Together column in the *Society for American Archaeology Bulletin*, Aldenderfer



(2000, p. xi) contended that archaeologists and local communities working together had become foundational to modern archaeology. I would argue that we still have a long way to go, because most archaeological research designs are still developed without any input from the local community or the wider public about what they want to know more about – what they would find valuable, interesting, and worth spending time and money on. In addition, the scientific analyses of material remains is usually conducted away from the site or landscape being researched, in places that are inaccessible to most people.

This could change with some innovative thinking and with will. In my view, Open Archaeology is a pathway to a more ethical archaeological practice in a pan-disciplinary research environment. This pathway would be facilitated by the methodological changes I have mentioned: the ‘flipped’ research design, the embeddedness of open participation, the normalisation of citizen science, and the portability of archaeological science, so that it can be done in and by local communities. I think archaeologists owe it to themselves and to the communities whose heritage they study to embrace this future.

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## Figure Captions

Figure 1. Elders of Quinhagak viewing the artefact collections at the opening of the Nunalleq Culture and Archaeology Center, August 11, 2018. This photograph was taken in the moments they first saw the objects (© Jacqueline Cleveland and the Nunalleq Project; used with permission).



Figure 2. Community archaeology project at the Bennachie Colony, Aberdeenshire, Scotland, a collaborative partnership between the Bailies of Bennachie and the University of Aberdeen. Volunteers were involved with excavation, soil augering and test pitting, artefact analyses, and archival research (© Jeff Oliver and the Bennachie Landscapes Project; used with permission).

Figure 3. Geoarchaeological analyses in progress in the 'lab tent' at ĪArte 6, on the Yamal peninsula, northwest Siberia (© Karen Milek and the JPI Climate: Social-Ecological Transformations: HUMANOR Project; used with permission).